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John A, Kitzhaber, MD, Governor

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March ?, 2012 *Also Sent Via E-mail*

Robert J. Wyatt
NW Natural
220 N.W. Second Avenue
Portland, OR 97209

Subject: Revised Construction Design Report Appendix E (Treatment System Design) Comments - Groundwater Source Control Measures Design, NW Natural "Gasco" Site

Dear Mr. Wyatt:

The Oregon Department of Environmental Quality (DEQ) reviewed the "NW Natural Gas Company, NW Natural and Siltronic Wastewater Treatment System Design Report" dated January 2012 (Treatment System Design). The Groundwater Source Control Construction Design Report[1] (Construction Design) includes the Treatment System Design as Appendix E. The Treatment System Design was prepared by Sevenson Environmental Services, Inc. for NW Natural.

NW Natural is moving forward with final design of groundwater source control along the shorelines of the "Gasco" site and the northern portion of the adjoining property owned by Siltronic Corporation (i.e., shoreline segments 1 and 2). Groundwater in the Fill water-bearing zone (WBZ) and the Alluvium WBZ along shore segment 1 and 2 have been identified as high-priority pathways of contamination from the uplands to the Willamette River which warrant source control. Groundwater source control involves preventing groundwater contamination in the Fill WBZ and the Alluvium WBZ from migrating to the Willamette River, and not mobilizing manufactured gas plant (MGP) dense non-aqueous phase liquids (DNAPLs) where they occur along Segment 1. The principal elements of groundwater source control include; 1) a fully penetrating interceptor trench in the Fill WBZ; 2) a well-based hydraulic control and containment (HC&C) system for the Alluvium WBZ; 3) a groundwater and DNAPL monitoring plan to evaluate the performance of the Alluvium WBZ HC&C system; and 4) a water treatment system.

NW Natural prepared the Construction Design, including the Treatment System Design, consistent with the framework for finalizing the design and constructing the HC&C system for the Alluvium WBZ. NW Natural proposed the framework in a letter dated November 4, 2011 that responds to DEQ's September 22, 2011 comments on the Revised Groundwater Source

[1] Anchor QEA, LLC, 2012, "Revised Groundwater Source Control Construction Design Report, NW Natural Gasco Site," January (received January 31, 2012), a report prepared for NW Natural.

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Control Interim Design Report[2] (Revised Interim Design). NW Natural proposed framework consists of five general steps as follows:

- Step 1 – NW Natural submits and DEQ reviews and approves the Treatment System Design
- Step 2 – NW Natural submits and DEQ reviews and approves the Construction Design and NW Natural constructs HC&C system
- Step 3 – NW Natural conducts initial full-scale HC&C System operation and testing
- Step 4 – NW Natural submits and DEQ reviews and approves the Operations & Performance Design Report
- Step 5 –NW Natural operate HC&C system full-time subsequent to receiving final individual NPDES permit for treatment system

The proposed framework is intended to achieve construction and testing of the HC&C system during the summer of 2012 to support the in-water sediment project planning and design process (i.e., complete Step 3 in the summer of 2012). NW Natural and Siltronic are conducting the in-water sediment project under the oversight of the U.S. Environmental Protection Agency.

DEQ accepted the framework for finalizing design and constructing the HC&C system as modified by a letter dated December 7, 2011. The December 7th letter should be referred to for additional information and details regarding each of the steps listed above. Regarding the Fill WBZ interceptor trench DEQ's position was communicated to NW Natural and Siltronic during a meeting on November 16, 2011 meeting and by the December 7th letter. That is, trench construction should be initiated within six months after the HC&C system is in place and the initial phase of testing is complete (i.e., within six months of completing Step 3).

Consistent with Step 1 of the framework for finalizing design and construction of the HC&C system, DEQ is providing comments on the Treatment System Design. For purposes of finalizing the document, DEQ's comments should be responded to in writing and/or fully incorporated into the final Treatment System Design.

NW Natural requested DEQ's review comments on the treatment system by April 2, 2012 to facilitate ordering long-lead treatment equipment. DEQ does not believe the comments provided in this letter prevent NW Natural from ordering equipment. **That said and for clarification, DEQ's review of the Treatment System Design does not represent an independent engineering analysis of the design, nor does our review imply the system will meet water quality discharge limitations and applicable water quality standards. For clarification, it is NW Natural's responsibility to perform these evaluations and design and construct a water treatment system that achieves permitted discharge limits. Achieving the discharge limits will be determined through monitoring effluent consistent with the individual NPDES permit for the treatment system which is in process.**

[2] Anchor QEA, LLC, 2011, "Draft Groundwater Source Control Final Design Report, NW Natural Gasco Site," May (received May 9th), a report prepared on behalf of NW Natural. DEQ recognizes the document as being the equivalent of the Revised Groundwater Source Control Interim Design Report and references the report in this letter accordingly.

GENERAL COMMENTS

Overall Treatment System Design. The Treatment System Design states (on page 3) that NW Natural based the treatment system design, in part, on analyses that, "…established the processes as effective in cost-effectively meeting Oregon DEQ's discharge standards." DEQ understands this statement to mean that NW Natural expects the treatment system to perform as well as the pilot system, including meeting all of the proposed discharge limitations (with the possible exception of "total cyanide"). NW Natural should confirm, clarify, or correct DEQ's understanding.

Waste Stream Determination. As indicated in our September 22, 2011 letter commenting on the Revised Interim Design, DEQ does not approve the treatment plant design without information being provided about system waste streams and management. DEQ's March 26, 2010 letter commenting on the Interim Design requested NW Natural to determine the regulatory status of each waste-stream (solid waste, hazardous waste), provide the basis for the regulatory determination (e.g., regulatory citation, knowledge of process, sampling data), and develop a plan for managing the material(s). DEQ considers the Treatment System Design to be incomplete from a regulatory standpoint without this information, or a commitment from NW Natural that a Waste Stream Determination for all waste streams in the treatment process will be prepared and submitted to DEQ. NW Natural should be advised that lacking a complete Waste Stream Determination the treatment system cannot be operated.

Cyanide Destruction Process. NW Natural's NPDES application supplement dated January 2012[3], states on page 15 that, "The selected cyanide destruction process is chemical oxidation using either hydrogen peroxide or sodium hypochlorite, depending upon which is found to be most effective." The application supplement also states that the treatment plant will be capable of using either chemical. It is unclear to DEQ whether and/or how this capability has been incorporated into the treatment system design. For example, will the lay-out of the main treatment system building allow for changing out cyanide destruct chemicals and equipment, or does the presence of two cyanide destruct reactors shown in Drawing FD-11 indicate both chemical oxidation processes are built-in to the system? NW Natural should provide information to address each of DEQ's questions and comments.

Besides changing out chemicals and equipment, the Treatment System Design does not describe conditions or discuss criteria under which the change in chemicals would occur. For example, to what extent would operational changes in the cyanide destruct reactor (e.g., contact/detention time, dose) be adjusted before chemicals are changed-out? Based on Drawing FD-4, DEQ understands the cyanide destruct step will initially rely on sodium hypochlorite. DEQ further understands that following a limited evaluation period if the concentrations of "total cyanide" are not consistently meeting "end of pipe" values, then the alternative oxidant (hydrogen peroxide) will be used and similarly evaluated. NW

[3] Sevenson Environmental Services, Inc., 2012, "NW Natural Gas Company, NW Natural and Siltronic Supplement to NPDES Application No. 967828," January (received January 31st), a document prepared for NW Natural.

Natural should confirm, clarify, or correct DEQ's understandings and describe the conditions under which chemical usage would change.

SPECIFIC COMMENTS

DEQ's specific comments and questions on the revised treatment plant design are provided below.

- As requested in our March 26, 2010 letter commenting on the Interim Design and our September 22, 2011 comments on the Revised Interim Design, NW Natural should provide documentation regarding management of solids generated during the treatment system pilot study for DEQ's information and completeness.
- The equation for precipitating manganese by air stripping shown on page7 appears to be incorrect (not balanced). DEQ believes the balanced equation is: $Mn^{+2} + 0.5O_2 + H_2O \rightarrow MnO_2 \downarrow + 2H^+$. NW Natural should evaluate any potential impacts this error might have on the mass balance information compiled in Appendix A. Appendix A should be revised accordingly.
- As indicated above, DEQ's September 22, 2011 comments stated that solid wastes such as treatment system sludge with detectable concentrations of chlorinated volatile organic compounds (cVOCs) should be managed as a hazardous waste. The design document should apply this characterization approach uniformly to each treatment system residual (e.g., sludge, spent carbon), but instead uses a variety of language that could be misinterpreted. Following are selected examples from the Treatment System Design:
  - Siltronic air stripper sludge - not discussed and/or addressed
  - Siltronic air stripper floating material and spent carbon (see pages 9 and 11) - should be tested for "detectable F002 waste"
  - Clarifier sludge (see page 14) will be tested for "F002 waste characteristics"
  - Combined Plant Residuals and filter press cake (pages 18 and 19) – will be analyzed for "F002 characteristics"

  This comment illustrates the need for, and supports DEQ's general comment regarding the need for a Waste Stream Determination of all waste streams, including those associated with the NW Natural and Siltronic pre-treatment systems and the combined treatment plant.
- For clarification, the contained-in concentrations listed in Table 2 do not apply to treatment system solids (e.g., sludge[s]). Environmental media, including soil, sediment, or groundwater contaminated by releases from Siltronic's former underground storage tank system, are impacted by an F002 listed hazardous waste. Groundwater with concentrations of cVOCs detected above contained-in concentrations is considered to be hazardous waste. Solids generated from the treatment of groundwater containing listed hazardous waste (e.g., treatment system sludge) are considered to be hazardous by the "derived-from rule" and should therefore be managed as hazardous waste. Treatment system residuals that exceed characteristic hazardous waste criteria must also be managed as hazardous waste. Note, this comment corrects a similar comment DEQ included in our September 22, 2011 comments letter by replacing "mixture rule" with "derived-from rule, and adding information about characteristic hazardous waste.

- DEQ understands that based on the results of the treatment system pilot study, the initial polymer to be used in the treatment system will be the anionic polymer AE843 from HYCHEM Inc. of Tampa, Florida. As requested in our September 22, 2011 comments letter, manufacturer's information should be provided for the polymer. For clarification, requested polymer information includes, but is not necessarily limited to physical and chemical properties, laboratory analyses, and MSDS sheets.
- DEQ acknowledges the relocation of the combined treatment system building to the northern portion of the site near the former office building. That said, pre-treatment system buildings are located within former lampblack and/or effluent ponds waste management areas. The soils underlying these former MGP waste management areas exceed human health and ecological risk-based criteria. Furthermore, NW Natural and DEQ agree that the former effluent ponds waste management area (i.e., the Tar Ponds area) represents a hot spot of contamination for soil and groundwater. The Final Construction Design Report should provide a development plan that addresses contamination during site preparation and construction of the treatment building, pre-treatment buildings, and all associated piping. DEQ expects recommendations regarding worker health and safety (e.g., vapor barriers) to be incorporated into the plan. The building locations should also be discussed in terms of uplands final remedial action alternatives (e.g., potential to interfere with, or an element of remedial alternatives.

Appendix A (Mass Balance). DEQ has the following comments regarding the information compiled in this appendix.

- Related to DEQ's general comment, it appears information on the cyanide destruction step is only provided for sodium hypochlorite (see page 33). NW Natural should include corresponding information for hydrogen peroxide. DEQ also recommends labeling both to indicate they represent two alternatives for treating cyanide.
- Estimates of the quantities of solids produced during water treatment are shown on page 35, however, it does not appear potential wastes generated in the pre-treatment facilities is included in the estimate. DEQ considers the information to be incomplete without information including pre-treatment NW Natural should review the information shown and make revisions as appropriate.

Appendix B (Drawings). DEQ's comments on drawings included in Appendix B are provided below.

Drawing FD-1. Sodium hydroxide (NaOH) input should be added to the NW Natural oil-water separator effluent (similar to Siltronic pretreatment).

Drawing FD-2. The text and drawings FD-1 and FD-4 show sodium hypochlorite introduced into the combined treatment system after flocculation and just prior to the cyanide destruct reactor. However, Drawing FD-2 appears to add another sodium hypochlorite injection point in the Siltronic pretreatment system. NW Natural should review Drawing FD-2 and confirm the sodium hypochlorite injection point shown is correct.

Drawing FD-4. The drawing shows vapor venting from the cyanide destruct tanks into outdoor air. NW Natural should explain how hydrogen cyanide in vapor has been considered in the design shown, including whether monitoring is needed to confirm hydrogen cyanide is absent from vented vapors.

Drawing FD-5. The label for "Waste Backwash to Influent" should be revised to read "GAC Filters to Spent Backwash Storage."

Drawing FD-9-11. Additional information is needed regarding where and in what manner waste solids from the treatment system will be temporarily stockpiled prior to waste characterization and appropriate off-site disposal.

Drawing FD-11. NW Natural should confirm there is adequate access and space within the treatment system building plan if alternative cyanide treatment chemicals and/or equipment are employed.

CHECKING THIS QUESTION - Confirm that treatment plant input flows from Gasco and Siltronic wells presented in Table 1 of the document are consistent with our understanding of pumping rates to achieve hydraulic capture objectives.

NEXT STEPS

NW Natural should written responses to each of DEQ's comments above. The responses should be provided within 30-days NW Natural's receipt of this letter.

Please feel free to contact me with questions regarding this letter.

Sincerely,

Dana Bayuk
Project Manager
Portland Harbor Section

Cc: Patty Dost, Pearl Legal Group
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